

IN THE CLAIMS

Please amend the claims as follows:

Claims 1-30 (Canceled).

Claim 31 (Currently Amended): A method for synthesizing a routing for an electrical and electronic architecture of at least one part of a product including electrical wires and electrical and electronic components, the method comprising:

representing a geometry of the product, divided into different zones, in two dimensions;

mapping routing points for routing of said electrical wires into the different zones, wherein each zone includes a plurality of said routing points;

mapping connecting points between the different zones, wherein each zone includes at least one of said connecting points;

mapping said electrical and electronic components into the different zones, wherein each zone includes a plurality of said electrical and electronic components;

undertaking a routing synthesis as a function of the geometry of the different zones and of the positions of the routing points, of the connecting points, and of the components;

undertaking an evaluation of the routing on a basis of quality and/or cost of said routing; and

depending on a result of the evaluation, modifying sites of the routing points, of the connecting points, and/or of the electrical and electronic components, and repeating the routing synthesis and evaluation.

Claim 32 (Previously Presented): A method according to claim 31, wherein at least one connecting point corresponds, in the product, to one connector and/or at least one routing point corresponds, in the product, to one connector.

Claim 33 (Previously Presented): A method according to claim 31, wherein, before the mapping electrical and electronic components, at least one of following choices is made:

- choice of electronic control units,
- choice of communication networks,
- choice of sensors and actuators,
- choice of fuse and relay boxes,
- choice of an electrical and electronic architecture.

Claim 34 (Previously Presented): A method according to claim 31, wherein, before undertaking the routing synthesis, characteristics are specified for the electrical and electronic components.

Claim 35 (Previously Presented): A method according to claim 31, wherein, after synthesis of the routing, cabling composed of the synthesized routing and of connectors is visually displayed.

Claim 36 (Previously Presented): A method according to claim 31, further comprising validating one routing among those evaluated, and calculating a technical specification for cabling composed of the validated synthesized routing and of connectors, and calculating a cabling cost and/or calculating a measure of quality.

Claim 37 (Previously Presented): A method according to claim 31, wherein the product is a vehicle and the different zones of the vehicle contain at least one of the following zones:

- a zone of a front face,
- a zone of a hood,
- a zone of an instrument panel,
- a zone of a roof,
- a zone of a trunk and tailgate, above and below the foregoing zones,
- a zone of a right front fender and of a left front fender,
- a zone of a right front door and of a left front door,
- a zone of a right column and of a left column,
- a zone of a right rear door and of a left rear door,
- a zone of a right rear fender and of a left rear fender, between the zone of the instrument panel and those of the right front fender and of the left front fender, the zones of the right front column and of the left front column, between the zone of the trunk and those of the right rear fender and of the left rear fender, the zones of the right rear column and of the left rear column,
- a zone above a floorboard, and
- a zone below the floorboard.

Claim 38 (Previously Presented): A method according to claim 31, wherein, for each electronic component, data pins associated with drivers and data, power pins corresponding to a supply, and ground pins are specified, and routing of data wires originating from data pins to the electronic components are automatically synthesized.

Claim 39 (Previously Presented): A method according to claim 31, wherein, for an automatically generated cabling, the cabling is manually modified such that:

- a) an end segment of routing points A and B is selected;
- b) a new routing point C is added to the segment;
- c) the new routing point C is associated with an existing routing point D via which a user preferentially wishes to make the cabling pass;
- d) the initially selected segment is deleted and segments AD and DB are generated if they do not already exist, and the initial routing AB is replaced by the routing AD and DB; and
- e) the automatically generated cabling is modified by iterating a) - d).

Claim 40 (Previously Presented): A method according to claim 39, wherein a subset of wires passing via the segment AB is selected in a).

Claim 41 (Currently Amended): A device for synthesizing a wiring for an electrical and electronic architecture of at least one part of a product including electrical wires and electrical and electronic components, the device comprising:

means for representing, in two dimensions, a geometry of the product, divided into different zones;

means for mapping, into the different zones, routing points for routing of said electrical wires, wherein each zone includes a plurality of said routing points;

means for mapping connecting points between the different zones, wherein each zone includes at least one of said connecting points;

means for mapping said electrical and electronic components into the different zones, wherein each zone includes a plurality of said electrical and electronic components;

means for synthesizing a routing as a function of the geometry of the different zones and of the positions of the routing points, of the connecting points, and of the components;
means for evaluating the routing on a basis of quality and/or cost of said routing; and
means for modifying sites of the routing points, of connecting points, and/or of electrical and electronic components.

Claim 42 (Previously Presented): A device according to claim 41, wherein the two-dimensional representation of the zones onto which the components are mapped comprises a global view of all of the zones and means for adding or removing zones.

Claim 43 (Previously Presented): A device according to claim 42, wherein, when a zone is selected in the global view of all zones, a local view of the zone appears, in which local view geometric characteristics of the zone can be specified.

Claim 44 (Previously Presented): A device according to claim 43, wherein the local view of a zone is edited by clicking and dragging, by an icon of a tool, routing points, connecting points, prohibited subzones, and/or ground points.

Claim 45 (Previously Presented): A device according to claim 41, wherein a routing point or a connecting point between zones can be transformed to a connector by clicking on an attribute of the routing or connecting point.

Claim 46 (Previously Presented): A device according to claim 41, wherein siting of different electronic components is specified by clicking and dragging a representation of the components in a hierarchical list.

Claim 47 (Previously Presented): A device according to claim 41, wherein the routing of different electronic components is automatically synthesized.

Claim 48 (Previously Presented): A device according to claim 41, wherein, for each electronic component, data pins associated with drivers, themselves associated with data, power pins corresponding to a supply, and ground pins are specified, and the routing of wires corresponding to the wires to the electronic component control units are automatically synthesized.

Claim 49 (Previously Presented): A device according to claim 41, wherein, if an electronic component is connected to a calculator in a system architecture design tool, then, during synthesis of the routing, data pins of the electronic component are connected to the calculator.

Claim 50 (Previously Presented): A device according to claim 41, wherein a cost of an electrical and electronic architecture is calculated automatically as a function of at least one function or evaluation.

Claim 51 (Previously Presented): A device according to claim 50, wherein the function or evaluation comprises:

a cost function of the connectors, based on a nomogram that shows an estimate of the price of the connectors as a function of a number of data, power, and ground connections, or based on a mean price assigned to each connection of a data, current, or ground wire;

an evaluation of the cost of the electronic components; or

a function of the cost of the wires based on their length and type, or taking a mean linear weight for power and ground wires, a mean linear weight for data wires, and a cost per unit mass of the component in which the wires are manufactured.

Claim 52 (Previously Presented): A device according to claim 41, wherein, given a mean cost for software and hardware drivers of different drivers and given a cost of implementation of an elementary operation, a cost of an electronic component of a complete electrical and electronic architecture is automatically estimated.

Claim 53 (Previously Presented): A device according to claim 41, wherein, given a synthesized routing and measures of quality for the connectors and portions of wire of different zones, a measure of quality of an electrical and electronic architecture is automatically estimated.

Claim 54 (Previously Presented): A device according to claim 41, wherein, given a measure of quality of the different electronic components mapped into the different zones, the quality of an electrical and electronic architecture is automatically estimated.

Claim 55 (Previously Presented): A device according to claim 41, wherein
given a measure of quality for each type of inputs/outputs and for each type of wire,
and given a measure of quality for execution of an instruction on a calculator, for access to random-access memory and for access to flash memory,

a measure of quality for execution of an elementary operation and for execution of a set of elementary operations on a calculator is automatically calculated.

Claim 56 (Previously Presented): A device according to claim 41, wherein, in each zone, routing points that are candidates for grouping power and ground wires into splices are automatically determined, and that which minimizes the wire length in the zone is automatically chosen.

Claim 57 (Previously Presented): A device according to claim 56, wherein the splices are taken into account in cost and quality evaluations.

Claim 58 (Previously Presented): A device according to claim 41, providing a system representation tool, the system comprising:

electronic components, each connected to at least one bus, and the tool representing, for each bus, components that are connected directly to the bus and, for components directly connected to at least two buses, for each of the at least two buses, associated with the component, an identifier of each other bus to which the component is directly connected.

Claim 59 (Previously Presented): A device according to claim 41, further comprising:

means for manual modification of an automatically generated cabling, the means for manual modification of the cabling comprising:

- a) means for inputting a selection of an end segment of routing points A and B;
- b) means for adding a new routing point C to the segment;
- c) means for associating the new routing point C with an existing routing point D via which a user preferentially wishes to make the cabling pass; and

d) means for deleting the initially selected segment and the segments AD and DB and for generating the routings AD and DB if they do not already exist, the initial routing AB being replaced by the routing AD and DB.

Claim 60 (Previously Presented): A manufactured article comprising:
a computer storage means having a computer program for designing a specification of a hardware and software system,
the program comprises a code for execution of the method defined in claim 31.

Claim 61 (New): A method according to Claim 31, wherein said product is a vehicle, wherein said step of representing is performed by dividing said vehicles in different zones of said vehicles; and wherein said electronic and electrical components include electronic control units, sensors, actuators, fuse boxes, relay boxes, and energy sources for said vehicle.

Claim 62 (New): A method according to Claim 61, further comprising defining prohibited subzones in each of said different zones, and said mapping of said routing points is performed such that said electrical wires are not routed through said prohibited subzones.

Claim 63 (New): A method according to Claim 62, wherein vertices of said prohibited subzones are routing points.

Claim 64 (New): A method according to Claim 62, further comprising validating a routing between a first routing or connecting point A and a second routing or connecting point B if said routing does not cross any prohibited subzone and if there does not exist a

routing point C that can be reached without crossing a prohibited subzone and such that the lengths of segments AC and BC are shorter than the length of segment AB.

Claim 65 (New): A method according to Claim 64, further comprising enumerating all validated routings and selecting a shortest routing.

Claim 66 (New): A method according to Claim 31, wherein said undertaking of said evaluation of the routing is performed by evaluating a cost of said electrical and electronic architecture.